

Aquaculture in Alberta

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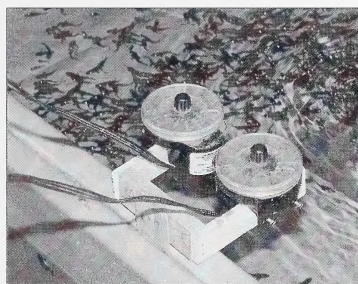
Issue Five, Winter 1999/2000

Feeding Fish ... They Need To Eat Too!

“What should I feed my fish and how often do I need to feed them” are two questions that Doug Millar, of Circle M Trout Farm, near St. Paul, gets all the time. His answer depends on whether you are a recreational or commercial fish farmer.

Ponds used for recreation are generally stocked to a level that the aquatic ecosystem sustains, without providing extra feed for the fish. If fish are lean or a portion of your stock are small at harvest time, Millar suggests you consider supplementing your fish with commercial feed. A 20 kg bag might be enough to feed your fish for the entire summer. Factors affecting

your choice of feeds would be availability, cost, nearest feed source and perishability. Most fish feeds for trout are high in protein and fat levels; so storage is a critical factor

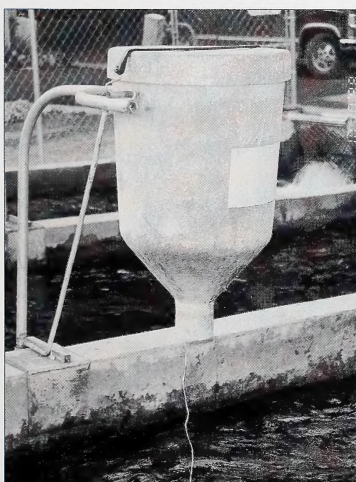


Electric hopper feeder, spins out feed at preset times.

affecting feed shelf life. All trout grower feeds should be stored in a cool, dry, mice proof area. For supplementary feeding of dugout fish, a floating feed is recommended. Generally, hand feed your trout in the morning or evening, enough that your fish will consume it all in 5 minutes, at once-a-day intervals.

Some people talk about using boiled wheat or dog food as a trout food. Feeding wheat can destroy the liver in your trout; most dog food has only half the protein content of fish food. Any savings in price is soon lost in slower growth rate and impaired water quality.

“Feeding fish on a commercial basis is quite different. Feeding is required every day and maintaining water quality, fish growth and health are the most important factors,” states Millar. Quality of the fish food is more important to an intensive commercial trout farmer than those who occasionally feed dugout trout. Fines, or small broken pieces of feed are devastating to fish gills. Always try to purchase feeds that stay intact and that are low in fines. Millar always chooses feed from a supply company that employs nutritionists and veterinarians, who constantly work with changing fish feed formulations.”



Demand feeder, activated by fish moving the feed wire

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The task of actually feeding the fish can be done in a number of ways. Feeders can be mechanical, either as belt feeders, timer feeders or even fish activated feeders as shown in the front page pictures. All can save time. Millar still prefers hand feeding, as he is then able to personally monitor the health of his fish on a daily basis.

Fish feed is expensive compared to other animal feeds, but that's because of its high protein and fat levels. "We reduce our feed costs at Circle M Trout Farm" notes Doug Millar "by purchasing fish feed by the truck load lots with other Alberta fish farmers." We also use freezers to store fish food that won't be used up in a short period of time.

As for the size of fish pellets to feed, it directly relates to the size of the fish you feed. Smaller fish need to be fed smaller-sized food. Most fish farmers use feed charts that tell them what feed size to use with a specific size of fish. Many commercial fish farmers sell feed in the spring. So when you are picking up your stocking fish, ask them what size you require and how much?

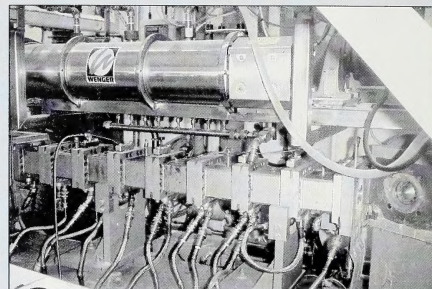
Finally, as harvest time approaches for trout, remember to stop feeding your fish at least one week prior to processing. This allows the flesh to firm up and purge the meat of any off taste.

"Many happy fish customers relate to me each spring about how much they enjoy getting out and just going down to the pond in the evening to feed the fish. So, why don't you give it a try," concludes Millar 🐟

**By Doug Millar of
Circle M Trout Farm, near St. Paul,
telephone (780) 724-2002**

Research on Extruded Fish Feeds in Alberta!

AAFRD's Food Processing Development Centre in Leduc has been working cooperatively with industry and other research organizations to help develop new high energy aquafeeds based on alternate protein sources. Key to this research is the Centre's twin-screw extruder.



Twin-screw extruder and preconditioner at AAFRD's Food Processing Development Center in Leduc

Extrusion is a process of cooking under pressure, moisture and elevated temperature. It combines several unit operations in a continuous, closed system including hydration, shearing, mixing, thermal treatment, starch gelatinization, protein denaturation, destruction of microorganisms and toxic compounds, shaping, expanding, texture alteration and partial dehydration.

Several types of extruders exist. Some have single screws and others, such as the one at the Food Processing Development Centre, have two intermeshing screws. There are advantages to both types of extruders. In the manufacture of higher energy feeds the twin screw machine is superior. One of the decisive advantages of the twin-screw extruder is that it accepts mixtures of raw material, regardless of their structure. Thus, diverse ingredients such as cereal, and pea protein flours, canola meal, animal meal, fresh meat, fat, nutrients, proteins, vitamins, or starch can be readily processed.

Extrusion is gradually replacing the pelleting system, which can only produce heavy density, sinking aquaculture feeds. Advantages of extrusion cooking in the production of aquaculture feeds include: the control of pellet density, increased feed conversion rate, greater feed stability in water and better production efficiency and versatility. Another advantage of extrusion over pelleting is that the extruder typically yields a cook value of more than 90% starch gelatinization, whereas the pelleting mill provides a very low cook on aquafeeds, usually 20 -25% starch gelatinization.

It has been found that aquafeeds, when extruded, require less feed to yield greater weight gains and less problems with disease. Floating feeds for the top feeding species, allows more control on feed quantity and therefore reduces feed waste. There is less environmental pollution by providing a feed pellet bound together with starch using extrusion processing technology. The Centre's twin screw extruder continues to be used for aquafeed extrusion and other developmental work with snack foods and pharmaceuticals 🐟

**Connie Phillips, food scientist for AAFRD's Food Processing
Development Centre in Leduc, telephone (780) 980-4865**



The “Water Act” and Aquaculture

Alberta’s new Water Act and supporting regulations came into effect January 1, 1999.

The new Water Act carries forward most of the provisions of the old Water Resources Act, and ensures that there will be no new interbasin transfers and no bulk exports of Alberta’s water.

A new provision in the Act is the option to “grandfather” or protect traditional agricultural water supplies through a registration process. Under the principle “first in time, first in right”, agricultural producers can register the highest sustained volume of water use for traditional agricultural purposes between 1996 and 1998, for each of their water sources. The priority

date given to each source extends back to the date a source was first used for traditional agricultural purposes, but cannot be earlier than 1894.

How does this affect aquaculture?

Most of the approximately 90 commercial aquaculture farms in Alberta file income tax as farm operations. They are therefore eligible to apply for a registration for their highest volume of water use between 1996 and 1998.

The several thousand recreational dugouts stocked with fish are not eligible to register the water volume related to recreational fish rearing, since this is not a traditional agricultural activity, nor does it constitute an agricultural business

with a reasonable expectation of profit. However, the volume of water used for any traditional activity (ie. filling sprayer tanks, watering cattle) from these recreational fish dugouts is eligible for registration.

Staff in Alberta Agriculture’s district offices and Alberta Environment’s regional offices have undergone extensive training on the registration process, and can assist farmers in completing an application form. This special registration process applies only to traditional agricultural activities, and is only available until December 31, 2001. For more information on the program please contact Alberta Agriculture or Alberta Environment ➔

**John Knapp, Director of AAFRD’s
Animal Industry Division**

EGG DISINFECTION

All salmon and trout eggs should be surface disinfected with iodine based compounds. This applies to eggs received from **ANY** private, provincial or foreign facility. This treatment not only protects wild stocks from introductions of foreign disease agents, but also ensures that your fish stocks remain uncontaminated from external parasites.

METHODS

Organic iodine compounds will control surface bacteria and viruses at levels of 75 - 100 mg/L (ppm) without effects to trout or salmon eggs, when given as a 10 minute exposure (bath). Two iodine products, **Betadine** and **Wescodyne** are available at most farm veterinary supply outlets. Other organic iodine products are likely acceptable, providing you calculate dilutions based on the labeled amount of active iodine present.

Wescodyne contains 1.6 % iodine. In order to make the 100 mg/L (ppm) iodine solution disinfection rate, you must dilute 1 mL of the "jug strength" Wescodyne with 150 mL of clean water. This produces a 100 mg or a 1:150 dilution that is added to the holding water. Two containers are needed, one to hold the solution and the second one to immerse and remove the eggs (i.e. Heath Tray basket).

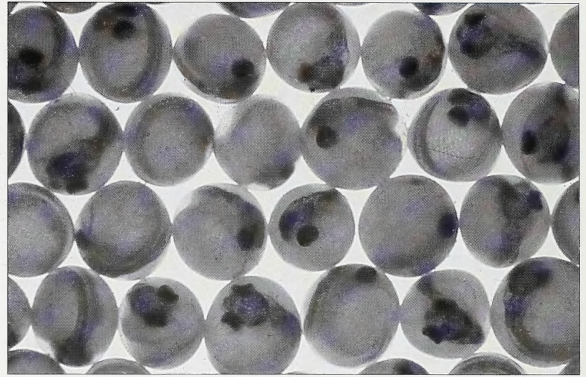
Exposure time for both recently fertilized "green" and more developed "eyed" eggs is 10 minutes. A 1:150 iodine solution will turn the water dark brown. The color lightens as the eggs remove some of the iodine. In soft water, iodine compounds may make the water acidic. Add 0.05 % sodium bicarbonate (baking soda) to this solution to help buffer the acidity.

CAUTION

Do not treat eggs within a few days (5 - 10 days) of normal hatching. Treatment during this period may result in the premature emergence of fry and high mortality rates.

Surface disinfection of salmonid eggs is considered a good management practice. It should be routinely performed, particularly now that only virological testing is required of the brood stock from which eggs are taken and exported [August 1997 Amendments to Fish Health Protection Regulations].

As an added precaution, all fish culturists who import eggs should consult with their egg supplier, whether their facility makes egg disinfection a routine practice. One way to check is by reviewing the required **Import Permit's Consignor's Declaration**, which states "Eggs in the shipment were disinfected immediately prior to shipment ___Yes___No"



Another check is to read the accompanied **Fish Health Certificate** provided by the supplier (exporter). This states in the **Exporters Declaration** (signed at the page bottom) that: "*I (named owner/manager) declare that eggs in the shipment will be surface disinfected prior to leaving the source.*"


Disinfect all eggs, regardless of whether they were previously done by the supplier. The cost is low for greater assurances of health and quality.

The following sample calculations provide an example of procedures to follow:

Container Volume Calculations: A treatment container (trough) of 100 cm long x 50 cm wide x 10 cm water deep has the following volume: $100 \text{ cm} \times 50 \text{ cm} \times 10 \text{ cm} = 50,000 \text{ cm}^3$ or **50,000 mL** (50 L).

Iodine Concentration to make a 1:150 dilution - if using 1.6% Wescodyne, then dilute 1 mL of product in 150 mL of clean water, or, if using 7% Betadine, then dilute 1 ml in 600 mL of clean water. For the above treatment container, you would require 333 mL of final diluted iodine solution, $50,000 \text{ mL} \div 150 = 333 \text{ mL}$. **Thoroughly mix solution in with trough water.**

Buffer Concentration: 0.05 % Sodium Bicarbonate (baking soda) = $0.0005 \times 50,000 \text{ mL}$ or **g = 25 g**

Treatment: Submerge the eggs in this bath for 10 minutes, then rinse in fresh water, before placing egg baskets back into the incubation unit 

For further information on egg treatment, contact:
Bev Larson (Provincial Fish Health Officer) at (780) 427 - 8288 or Ron Beck (AAFRD) at (403) 381-5573.

Profile on White's Fish Farm - Onoway

... an Onoway area family in the business of raising trout since the 1960's.



Who would have thought that in the early 1960's Joe White would be carving a niche for his son, Dave, by raising rainbow trout in his gravel pit ponds, north of Stony Plain. Those early years of recreation developed into a commercial business, because Joe White wanted to become self sufficient and not rely on the uncertainty of importing trout to restock his ponds.

In the 1970's Dave's father learned how to spawn his own trout, hatch eggs, and then sell his Alberta raised fingerlings to farm dugouts. There was considerable information to learn, while continuing to maintain a gravel & trucking operation and raise a family. Learning meant taking trips to the government hatcheries in Jasper and Calgary, asking many questions and finding out by trial and error.

It took a dedicated person such as Joe White to make raising and selling of "Alberta" trout a viable hobby during his retirement years. Of course, credit should also go to Joe's wife, Barbara, who was always there. Dave recalls "my mother, while in her eighties, still helped me haul in net fulls of fish for delivery to waiting ponds."

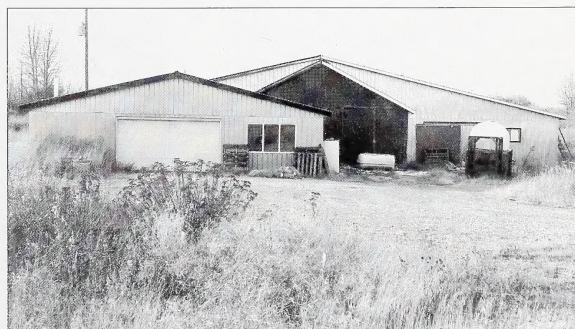
Now Dave White runs the fish farm, having inherited the aquaculture tradition in 1986. White's fish farm training began early in life through his dad, prior to a stint of professional hockey in Europe and the USA. Dave also knew about working long hours and commitment, hauling water for the oil patch. Now it was time for him to settle down.

Thirty years after the original ideas, in 1994, Dave White made a commitment to expand his fish farm. Enough of using outdoor ponds and a couple of sheds. Now, his fish farming would be self sufficient and a full-time obligation, using an indoor heat controlled barn, complemented by five outdoor ponds. The barn houses a complex recirculation system with potential to accommodate nearly a dozen round holding tanks, each serviced with biological filters. Young fish can grow year-round in this controlled environment. As for the ponds, they hold the larger-sized fish (in net pens or cages).

In the aquaculture industry you learn by experience. The story goes, "You're not a fish farmer until you've weathered some substantial fish losses."

If that's the case, then White is a true fish farmer! "I've had my share of startup misfortunes," mentions Dave, "losing my spawning trout one year, all my fish eggs another year, and then a complete tank of fingerlings." Things are now starting to turn around, where I can begin to increase my production.

Dave plans to raise spawning trout again, once the ponds are rehabilitated and landscaped. The fingerlings he raises are kept for up to a year; then delivered directly to neighborhood farm dugouts, typically within 100 kilometres. Eventually, Dave hopes to synchronize his trout to spawn at different seasons. This would allow him to have young at different months of the year and have all age classes available. Another goal is have enough growing fish in recirculation tanks to hire a full-time assistant 🐟



White's Fish Farm, near Onoway,
telephone (780) 967-5594.

From Pond to Plate

Can I Harvest Trout with a Net?

Many people feel that using a net to catch fish in their private pond is not legal. "On the contrary," says Dennis Wiebe of Leckie's Lakefish Net & Twine Ltd. "If you raise fish in your pond and have a current recreational fish culture licence, then netting is an accepted method to harvest your fish," particularly where winterkill is a factor. "Before buying a net, you need to know the average size of your fish at harvest time, the pond's width and average depth."

Cost is not expensive, roughly \$4.50 per running metre (\$1.75 per foot). Nets are commonly 10, 20 and 30 metres in length (30, 60 and 90 feet), with an average depth of two metres. On request, custom lengths can be made. Remember, longer nets are more difficult to handle. Nets, usually made of monofilament line come with a leaded bottom line and floats to keep the net in a vertical position. You need to firmly anchor each end.

The following table shows approximate mesh sizes to consider, when ordering gill nets. If you have variable-sized fish, then there is an option of purchasing one gill net that has mesh sizes from 2" to 4". This is called a gang gill net.

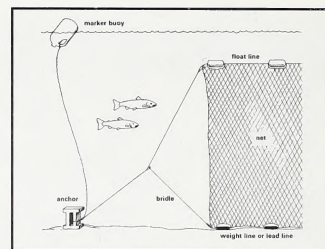
BUYING A GILL NET			
Fish Size		Mesh Size	
18-23 cm	(7-9")	5.1 cm	(2.0")
23-30 cm	(9-12")	6.4 cm	(2.5")
30-36 cm	(12-14")	7.6 cm	(3.0")
36-46 cm	(14-18")	8.9 cm	(3.5")
46-51 cm	(18-20")	10.2 cm	(4.0")

Other nets, including seine nets are available. Seine nets are made so that even small fish are not able to escape. These nets are meant to be pulled from one side of the pond to another. However, seine nets must be pulled to work. Ponds with considerable vegetation, muck bottoms or width, will be difficult to successfully seine.

Winter gill netting is possible, with use of a jigger that moves through the water, but under the ice. The jigger, pulled by rope, moves laterally until it reaches the desired net length. A hole is then cut into the ice and the jigger surfaces. Jiggers can be made at home, but are not expensive to purchase.

As a rule, set the nets in your pond for less than 12 hour intervals. Be ready to process all fish immediately after pulling the net. If you don't know whether your fish are of harvest size or you only want a few fish, do a test net and set it for only a few hours.


Once the fish are harvested, they need to be dressed quickly and packed on ice or frozen. If freezing is desired, keep below -10° C. If frozen with head on, then remove gills. If packed in ice, then remove all gut material,



Setting a net. Attach the float and anchor lines to the rope bridge, not directly to the net

rinse body cavity, and pack belly down between layers of crushed ice.

Those involved with outdoor commercial fish farming can rely on nets to quickly harvest fish, be it for farmers markets or local outlets. With proper storage, care and repair, a fish net can last for years.

Leckies Lakefish Net & Twine Ltd. does sell various nets, jiggers, filleting equipment and outside apparel. There are a number of depots set up in rural communities to help serve the public. These include: Calgary, Stettler and Bashaw 

Dennis Wiebe,
Leckie's Lakefish Net & Twine Ltd.,
14939-112 Avenue, Edmonton,
Telephone (780) 453-3481



Carefully setting a floating gill net.

Aquaculture Section Update ... by D. Lloyd

One of the primary reasons for writing this column is to share information about AAFRD's aquaculture section current commitments and future priorities. I will highlight the major activities and issues affecting aquaculture development here in Alberta.

Risk Assessment

The risk assessment for the introduction of American eels was successfully completed. The species has now been added to the Ministerial Regulations as a permitted species under a Commercial B licence (with conditions). It is now possible to import eels at the glass eel stage of life and raise them until reaching maturity where they can be marketed for the table food industry.

AAFRD's risk assessment committee is currently still reviewing and investigating two risk assessments for the proposed introduction of mature American eels and Apple snails for the food market. A decision is expected very soon.

Whirling Disease

The Whirling Disease Task Force and the accompanying Expert Panel is close to completing its Risk Assessment on the importation of live salmonids into Alberta. The 1999 testing of wild salmonids has found no infected fish. The committee expects to file its Risk Assessment Recommendations to the respective Ministries early in 2000.

Silver Carp

AAFRD in conjunction with its partners the Lethbridge Community College, Eastern Irrigation District, Alberta Agriculture Research Institute, PFRA and the Alberta Fish Farmers Association have received approximately 4000 triploid Silver Carp. The two year research study proposes to study the fishes capability to survive and control algae in Alberta's farm ponds.

Federal - Provincial - Territorial Task Group on Aquaculture

In September 1999, the Council of Canadian Fisheries & Aquaculture Ministers (CCFAM) established sector task groups to focus the collective efforts of the Federal, Provincial and Territorial ministries responsible for Fisheries and aquaculture on key issues facing the industry. The Aquaculture task group is made-up of both federal and provincial government representatives who are working together to create environmentally sustainable and economically viable opportunities for the aquaculture sector. Currently the group is preparing discussion papers on: Research and Development for Aquaculture; Siting Criteria for Aquaculture; National Aquaculture Code of Practice and a review of Fish Health Issues Impacting the Canadian Aquaculture Industry. Their recommendations will be brought back to the CCFAM at their annual meeting in the summer of 2000.

Duncan Lloyd, Manager of AAFRD's Aquaculture Section in Lethbridge, telephone (403) 381-5539

Controlling Blue Heron Predation with electric fencing

Many fish farmers call about losing their fish to Great Blue herons. Some mention seeing wounded fish, with spear marks on their back. One of our commercial fish culturists has a solution that works well for him. Dan Radomske of Valley Spring Trout, near Innisfail uses an electric fencer, originally purchased for his Gelbvieh cattle. The charged wires are placed around the pond's perimeter, where herons wade into. "Contact with the wire produces a pulsing shock," says Dan "not fatal, but sure trains them well. Any educated bird sneaking up to the shore's edge, sees the wires and hears the electrical pulse, then quickly leaves."

Of course, wire placement is key. You need two wires, spaced 40 centimetres (cm) apart, located about 10 cm above the water surface. "I've seen herons sneak under a 20 cm wire height" notes Radomske. He uses a 1.5 metre length of reinforcing bar, welded to a 40 cm bar, forming a "T." Each end of the 40 cm bar holds an insulator, which keeps the electric wire up and away from the metal bar. Push most of the 1.5 metre length of reinforcing bar into the mud, near the shore.

You need to have solid posts on each corner, to prevent the reinforcing bars from eventually bending over into the water. Also, keep away from shoreline plants, that can short the power out.



2-wire electric fence for preventing of Great Blue heron access. Wires are spaced 40 cm apart and 10 cm above water level.



COURSES, PUBLICATIONS & EVENTS

Courses

“Raising Fish in Your Pond” is a course that will be held at more than 30 Alberta locations, over the next two years. Planned for late January to the first week of March, these courses are organized by the Alberta Fish Farmers Association in conjunction with AAFRD. This year, courses are scheduled for Grande Prairie, Peace River, Valleyview, Barrhead, Stony Plain, Morinville, Lac La Biche, Smoky Lake, Wainwright, Red Deer, Coronation, Drumheller, Strathmore, Medicine Hat, and Taber. Contact your nearest AAFRD district office to register.

“Basic Principles of Aquaculture,” a two-day course is again being offered this spring by AAFRD in conjunction with the Lethbridge Community College and the Alberta Fish Farmers Association. This course is planned for March 17 and 18, to be held in Penhold. This introductory course is intended for those interested in pursuing commercial fish culture. It provides an overview of facility design & construction, water quality, feeds, licensing, planning & marketing. A field trip is scheduled.

To obtain more information on these courses contact: Eric Hutchings, of AAFRD's Aquaculture Section in Lethbridge, toll free by dialing 310-0000, then 381-5574 or dial direct with area code (403) 381-5574.

Publications

A selection of aquaculture publications and videos are available on short-term loan through your local AAFRD office. Most are maintained with the Aquaculture Section in Lethbridge.

The following fact sheets are also available at the AAFRD office near you, or on our Internet website, including:

Algae Control in Ponds. Agdex 485/716-2

Predator Damage Control

Constructing Dugouts for Fish. Agdex 485/716-1

Fish Culture Licences. Agdex 485/84-1

Screening Your Fish Pond. Agdex 485/87-1

Biological Weed Control in Alberta using Triploid Grass Carp. Agdex 485/641-1

Freshwater Aquaculture Industry. Ag - Venture series Agdex 485/830-1 (under review).

Aquaculture Profit\$... for a rainbow trout intensive fingerling enterprise. Agdex 485/821-1

Events

February 2-5, 2000 AQUACULTURE AMERICA 2000 Marriott Hotel, New Orleans, Louisiana National Aquaculture Conference & Exposition, Co-sponsored by National Aquaculture Association, US Aquaculture Suppliers Association, US Chapter of WAS.

Feb. 3 - 5, 2000 National Whirling Disease Symposium. Coeur d'Alene Resort, Idaho. Contact Whirling Disease Foundation, (406)585-0860

Feb. 18-19, 2000 12th Annual Minnesota Aquaculture Conference and Trade Show - Grand Casino Hotel Hinckley, Minnesota. Come to learn from successful fish farmers & other experts.

May 28-31, 2000, Aquaculture Canada 2000 Hotel Beausejour, Moncton, New Brunswick. 17th annual meeting of the Aquaculture Association of Canada. The AAC Millennial Conference and Exposition will cover a broad spectrum of aquaculture topics and will attract growers, scientists, administrators, educators and students. Contact Dr. Andrew Boghen at (506) 858-4321. Fax: (506) 858-4541. Email: AAC2000@umoncton.ca Website: <http://www.aac2000.org>

July 13-15, 2000 National Recirculating Aquaculture Workshop at Lethbridge, Alberta, Canada. This workshop will address all the technologies used to raise fish successfully in a closed system. This is the first such workshop in inland western Canada. Speakers will cover water reuse, filtration, structures and management of disease and waste. Contact Cheryl Regier at (403) 382-6991; Fax at (403) 317-3504 or Email at cdregier@raptor.lethbridge.ab.ca

July 20-23, 2000 The Third International Conference on Recirculating Aquaculture Systems - Hotel Roanoke & Conference Center Roanoke, VA

September 3 - 5, 2000. The Fifth International Symposium on Tilapia in Aquaculture will be held in Rio de Janeiro, Brazil. The ISTA Symposia are the principal meetings for tilapia producers, marketers and researchers and this will be the first held in South America. The year 2000 meeting is being co-sponsored by the American Tilapia Association, and numerous other foreign and domestic aquaculture organizations. For more information visit:

<http://Ag.Arizona.Edu/azaqua/ista/ista5.htm>

Editor's Notes

This is the second issue of Aquaculture in Alberta produced in 1999. If you would like to submit articles, provide us with input or be placed on the mailing list, contact Eric Hutchings, the editor, in Lethbridge at (403) 381-5574 or use the following E-mail address eric.hutchings@agric.gov.ab.ca

The Internet address for Alberta Agriculture, Food & Rural Development's **“Ropin the Web”** Home Page is www.agric.gov.ab.ca

This home page contains aquaculture information (fact sheets, fingerling suppliers lists, aquaculture links, etc.)

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